

***Impatiens fugongensis*, *I. yui* and *I. xanthina* (Balsaminaceae), Three New Additions to Flora of India**

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Impatiens fugongensis K. M. Liu & Y. Y. Cong, *I. yui* S. H. Huang, and *I. xanthina* H. F. Comber (Balsaminaceae) are reported as new additions to the Flora of India. Among the species *I. fugongensis* and *I. yui* have been considered endemic to China.

Key words: Arunachal Pradesh, *Balsaminaceae*, *Impatiens*, India, new additions.

In India there are 203 species of *Impatiens* (*Balsaminaceae*) recorded, of which 137 species are endemic (Vivekananthan et al. 1997, Swaminathan et al. 2001). Further species have recently been discovered and added to the *Impatiens* flora of India by subsequent workers (Pusalkar and Singh 2010, Dessai and Janarthanam 2011, Bhaskar 2012, Gogoi and Borah 2013a, 2013b). During the past few years some specimens of *Impatiens* were collected from different parts of Arunachal Pradesh, NE India for the project “*Impatiens* L. (*Balsaminaceae*) Flora of Arunachal Pradesh”. These specimens were critically studied and compared with the descriptions available in literature and authentic herbarium material at CAL, ASSAM, and ARUN. Consequently three species were found to be new to the Flora of India.

Impatiens fugongensis K. M. Liu & Y. Y. Cong in Bot. Stud. 49: 161, f. 1 (2008). Type: CHINA. Yunnan: Fugong Xian, Gaoligongshan, on damp cliff, 2200 m, 12 Oct. 2006, K. M. Liu & Y. Y. Cong 791378 (HNNU!). [Fig. 1]

Annual succulent herb up to 18 cm tall. Stem hairy, pinkish, rounded. Leaves alternate, exstipulate; petiole hairy, greenish, 0.5–2 cm, with few pairs of glandular hairs; blade elliptic, 1.5–5.5 × 0.9–2.2 cm, hairy on both sides, margin serrate, teeth red, apex acute to acuminate, base cuneate to obtuse. Inflorescence axillary, 2-flowered; peduncle 1–2.5 cm long, hairy. Floral bract persistent, triangular to ovate, 0.1–0.3 × 0.5–1 cm. Flower yellow, up to 1.7 cm deep, front 2 × 1.3 cm; pedicel 1–1.4 cm, green, hairy. Lateral sepals 2, greenish, ovate, slightly curved, to 0.3 × 0.15 cm, apex acute, hairy. Lip (lower sepal) navicular, 2.7 cm long (whole), hairy, yellow, tapering into a spur, mouth to 0.7 × 0.5 cm, cornuted; spur curved or coiled, to 1.5 cm long, tip bilobed, red. Upper petal (standard) navicular, slightly ridged, greenish yellow, hairy, 6–7 × 2–3 mm. Lateral united petals (wings) 2 lobed, lobes unequal, to 1.3 cm long (whole), yellow; basal lobe reduced, 0.3–0.5 × 0.1–0.15 cm, linear to lanceolate, apex obtuse or sometimes acute; distal lobe much larger than the basal lobe, 0.9–1.1 × 0.5–0.7 cm, one side almost rounded, apex obtuse, pointing slightly

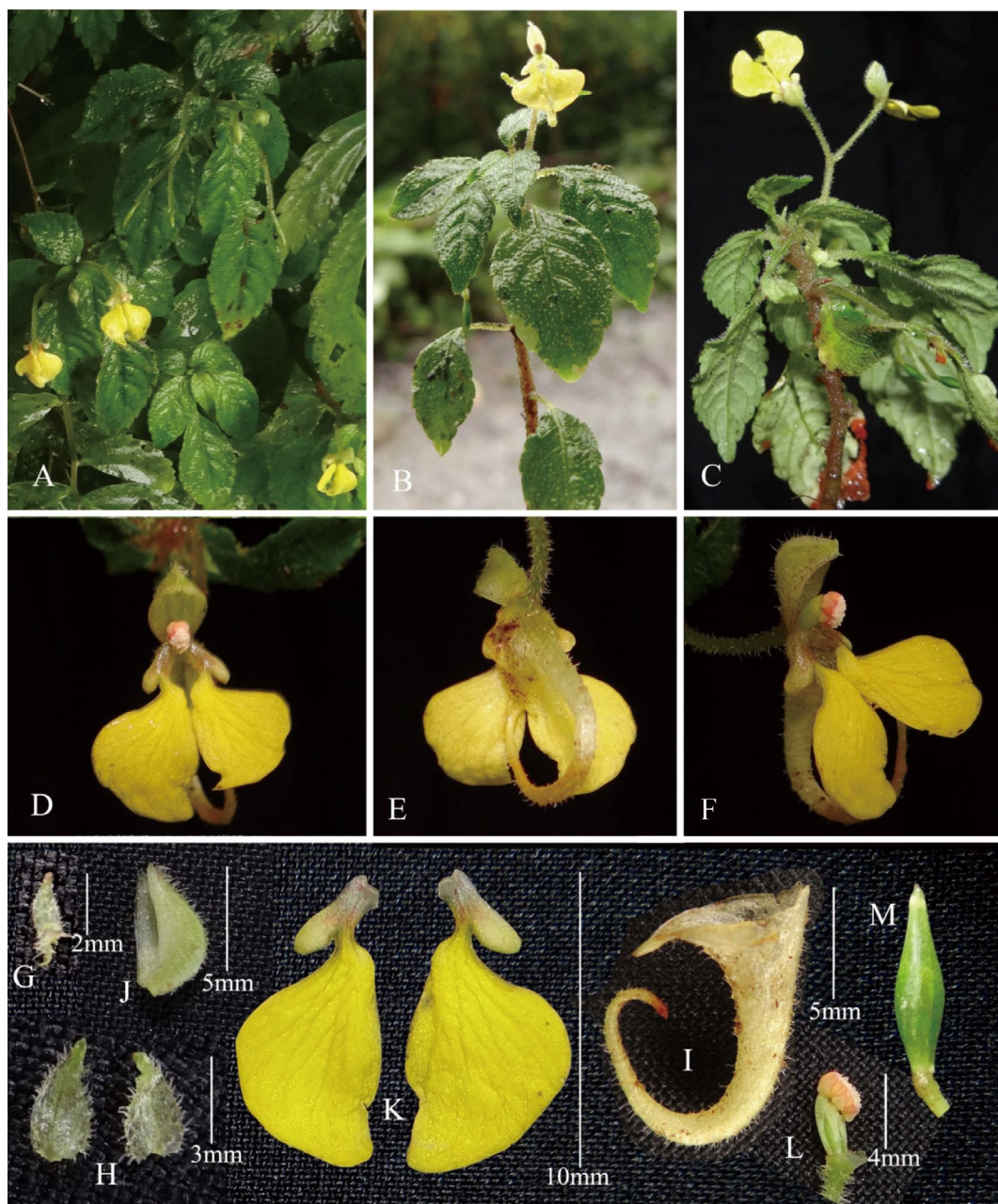


Fig. 1. *Impatiens fugongensis* K. M. Liu & Y. Y. Cong. A. Plants in natural habitat. B, C. Flowering twig. D. Front view of flower. E. Rear view of flower. F. Lateral view of flower. G. Bract. H. Lateral sepals. I. Lip (lower sepal). J. Standard (upper petal). K. Lateral united petals (wings). L. Androecium. M. Fruit.

outward. Stamen 5, slightly curved, filament 0.3 cm long, greenish, anther lobes obtuse. Fruit swollen at the middle, to 1×0.3 cm, green, ridged. Seeds not seen.

Flowering & Fruiting: August–September.

Distribution: India and China.

Habitat: It grows in temperate moist rocky and shady slopes in association with *Elatostema*

spp., *Hypericum* sp., *Rubus* sp., etc.

Specimens examined: **INDIA**. Arunachal Pradesh, Lower Dibabg Valley District, Myodia, 2–3 km ahead of 65 point towards Hunli, 2100 m, 28°16'38.65"N 95°55'19.10"E, 16 Sep. 2012, R. Gogoi & S. Borah 21862 (ASSAM, ARUN).

Note: Specimens of *Impatiens fugongensis* collected in the present collection from India show some ecological variation, i.e., stem pinkish, less hairy, peduncle longer (up to 2.5 cm), bracts persistent; flowers only 2 against stem pale green, densely hairy, peduncle shorter (up to 2 cm), bracts caduceus, flowers 2–3 in the Chinese specimens.

This species is close to *I. hengduangensis* Y. L. Chen in habit and flower colour but easily distinguishable due to its tiny nature, densely hairy stem and leaves, only 2 lateral sepals, much smaller basal lobe of lateral united petals, and lack of red markings in the petals and lip (lower sepal) of the flower.

Impatiens yui S. H. Huang in Acta Bot. Yunnan. **25**(3): 266, pl. 4, f. 1–7. (2003). Type: CHINA. Yunnan: Gongshan, Dulongjiang, mixed forest, 1800 m, 27 Aug. 1938, T. T. Yü 19964 (KUN!). [Fig. 2]

Annual succulent herbs, sparsely branched, up to 30 cm tall. Stem green, slightly hairy, terete, not swollen at nodes. Leaves distributed evenly along stem, alternate; petiolate to subsessile, petiole 0.2–1 cm long, green; leaf blade elliptic, puberulent both side, 1.7–7 × 1.5–4 cm, slightly hairy both sides, base cuneate, apex acute, margin crenate, setose between teeth, exstipulate, veins 4–5 pairs. Inflorescence axillary, single-flowered; peduncle absent, flower bud whitish. Flower white with pink flush; pedicel 1.5–2 cm long, green, slightly hairy; bract position at the middle, persistent, lanceolate, green, hairy, apex acute, midvein not prominent, hairy. Lateral sepals 2, ovate, greenish, with some red spots, hairy, to 1.1 × 0.8 cm, apex acuminate, margin hairy, greenish. Lower sepal (lip) bucciniform, pinkish white, to 2.8 cm deep; mouth beaked, up to 2 cm; spur

white or pale green, up to 1 cm long, curved, tip white. Upper petal (standard) pinkish white, rhomboid, 1.7 × 1.2 cm, apex acuminate, dorsal side not ridged. Lateral united petals (wings) whitish, bilobed, up to 2.7 cm long (whole), apex acute, slightly clawed, breadth of basal lobe up to 1 cm, shape of distal lobe oblong, slightly dolabriform, apex obtuse or acute, breadth of distal lobe 5–6 mm, auricle absent or inconspicuous. Stemens 5, united, enclosing ovary, up to 0.5 cm tall, anther lobes obtuse. Capsule linear, green, smooth, up to 4 cm long. Seeds not seen.

Flowering & Fruiting: August–September.

Distribution: India and China.

Habitat: It grows as an undergrowth or ground vegetation in the forests of *Rhododendron* spp., *Arundinaria griffithii*, *Gaultheria wardii*, *Quercus* sp., etc.

Specimens examined: **INDIA**. Arunachal Pradesh, near Shiv Mandir, Mayodia, 18 Sep. 2012, R. Gogoi & S. Borah 21872 (ASSAM, ARUN).

Note: The present collection of *Impatiens yui* from India having some variation like shorter habit, smaller size of leaves, shorter petiole up to 1 cm long against up to 3 cm and single flower against 2 flowers in the Chinese samples.

Impatiens xanthina H. F. Comber in Notes Roy. Bot. Gard. Edinburgh **18**: 248 (1934). Type: CHINA. Yunnan. G. Forrest 29913 (E!). [Fig. 3]

Annual succulent herb, plants 15–20 cm tall. Stem slightly ribbed, light green with dark brown spots. Leaves mainly confined to the upper portion of stem, alternate to sub-opposite, leaf obliquely narrowly elliptic, petiolate; petiole 0.2–0.3 cm, winged, glabrous, light green or slightly brown at base; stipule absent, leaf blade narrowly elliptic, 1.2–6 × 0.6–1.7 cm, midrib raised on both sides, glabrous or slightly pubescent above, margin serrate, setose between teeth, apex acute, base cuneate. Inflorescence axillary, 2-flowered, peduncled; peduncle hairy, 1.3–2.6 cm long, dirty brown, flower yellow with dark reddish spots at base; bract hairy,

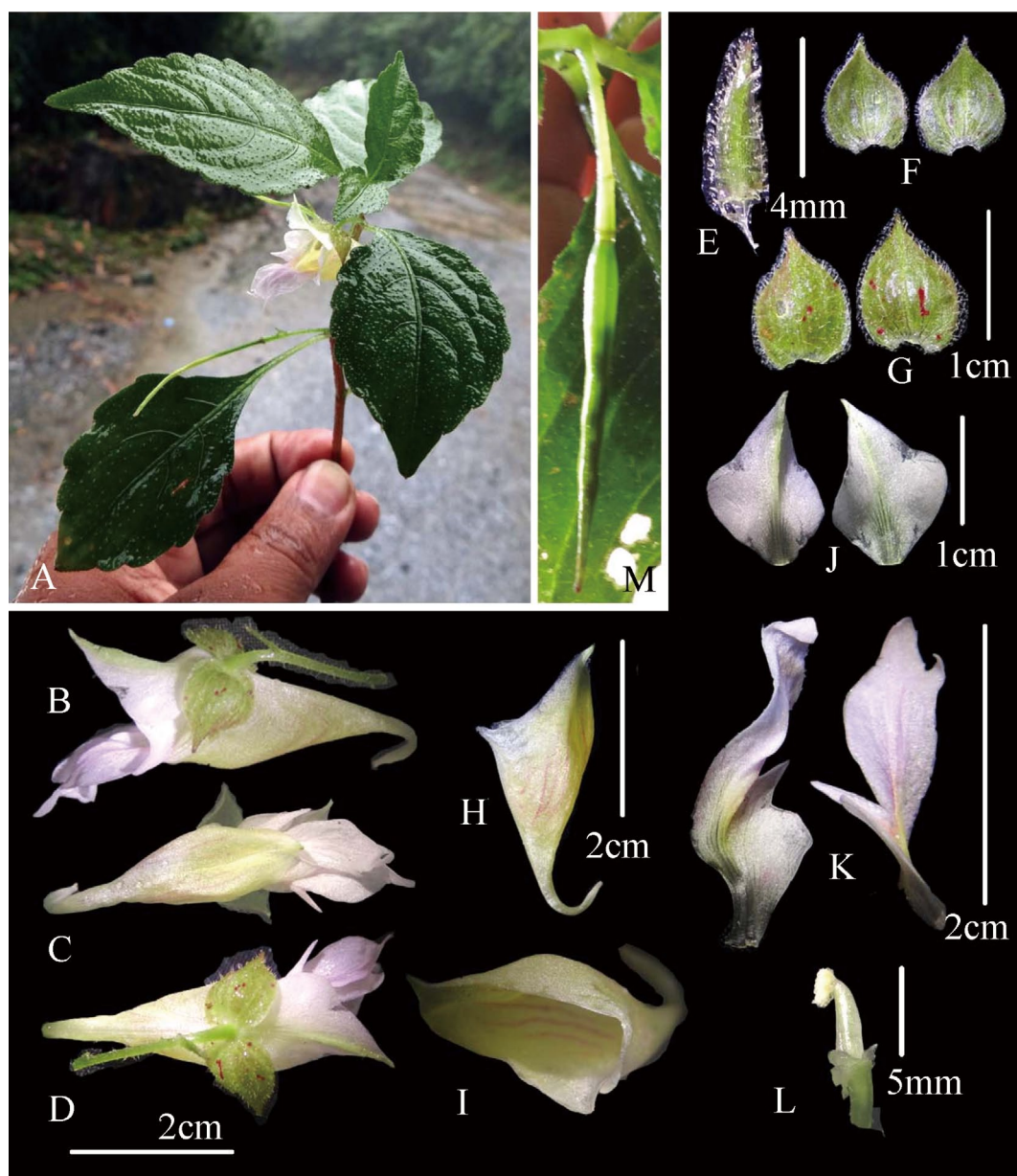


Fig. 2. *Impatiens yui* S. H. Huang. A. Flowering twig. B. Close view of flower. C. Ventral view of flower. D. Dorsal view of flower. E. Bract. F. Lateral sepals (from ventral side). G. Lateral sepals (from dorsal side). H. Lip (lateral view). I. Lip (front view). J. Standard or upper petal (from dorsal and ventral views). K. Lateral united petals (wings). L. Androecium. M. Fruit.

lanceolate, apex pointed, 3×1 mm, brown or light green. Mouth (front view) $1.6\text{--}1.7 \times 1.5$ cm; pedicel hairy, greenish brown, $0.5\text{--}0.7$ cm long. Lateral sepals 2, obliquely ovate, $0.4\text{--}0.5 \times 0.15\text{--}0.2$ cm, light yellowish, hairy, apex

acuminate, base truncate. Lower sepal (lip) navicular, tapering into a spur, mouth $0.7\text{--}0.8 \times 0.3$ cm, without any appendage, whole lip $2.5\text{--}3.4$ cm long, spur to 2.5 cm long; spur curved downwards, long filiform, yellow, tip light green

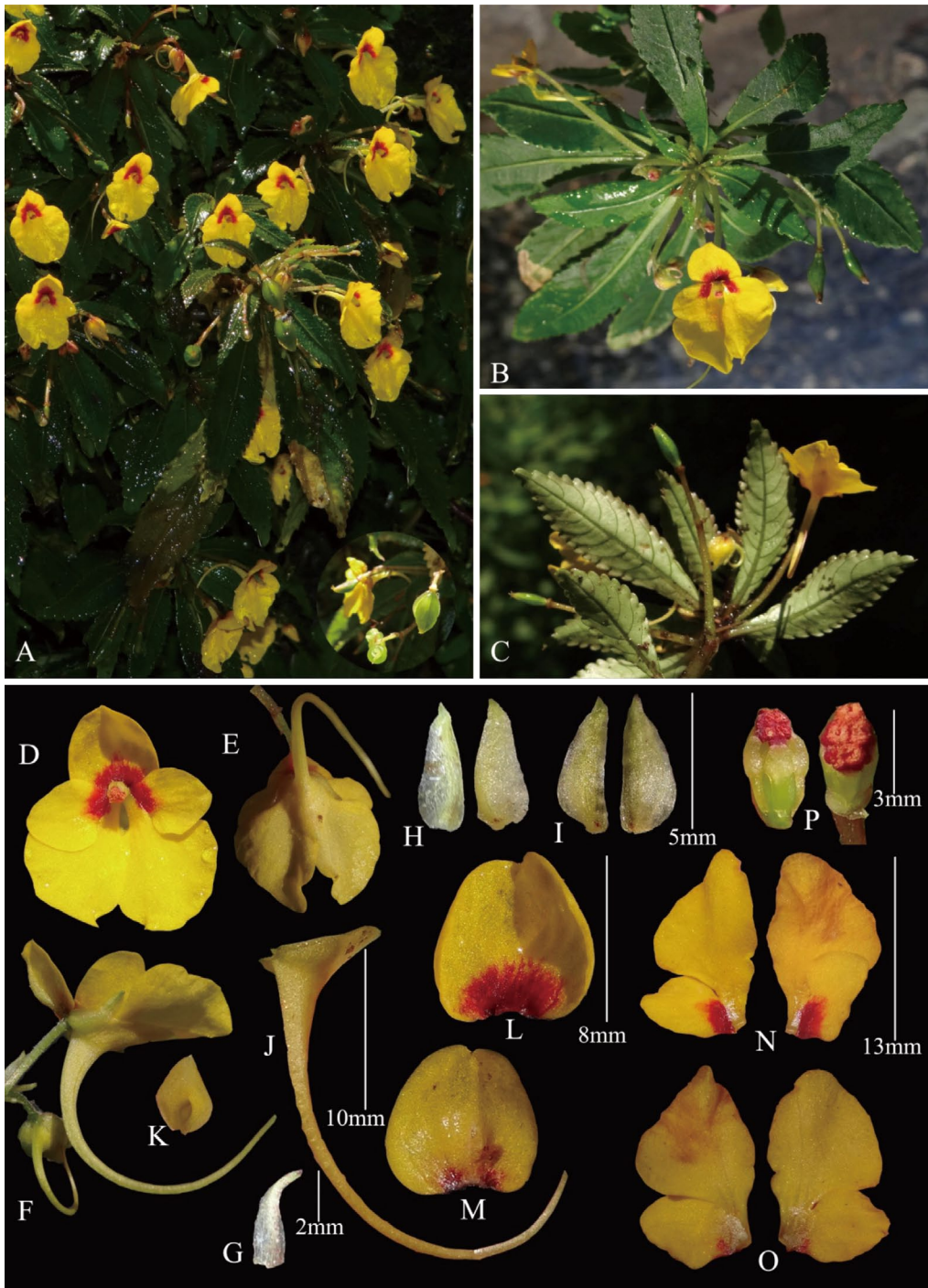


Fig. 3. *Impatiens xanthina* H. F. Comber. A. Plants in natural habitat. B. Front view of flowering twig. C. Rear view of flowering twig. D. Front view of flower. E. Rear view of flower. F. Lateral view of flower. G. Bract. H. Lateral sepals (from dorsal side). I. Lateral sepals (from ventral side). J. Lip (lower sepal). K. Front view of a lip. L. Standard or upper petal (ventral). M. Standard or upper petal (dorsal). N. Lateral united petals (from ventral side). O. Lateral united petals or wing (from dorsal side). P. Androecium.

to reddish, not twisted, spur 2–3 cm long. Upper petal (standard) sub-orbicular, golden yellow, dark reddish spot at base of both sides, cucullate (slightly ridged) hairy, apex emarginate, height 0.5–0.8 cm, breadth 0.5–0.8 cm. Lateral united petals (wings) bilobed, yellow reddish blotch at the base of the basal lobe, lobes unequal, 1.2–1.4 cm long, basal lobe 0.5–0.6 cm long, up to 0.5 cm (breadth), distal lobe 1.2–1.3 cm long, up to 8 mm wide, apex obtuse, without auricle. Stamens 5, anther lobe reddish, obtuse, straight or slightly curved, filament light yellow. Fruit ribbed, swollen at middle, green, 1–1.3 cm long, 0.4–0.6 cm wide, pedicel 0.7×1 cm. Seeds brown with rough surface, 1 mm across.

Flowering & Fruiting: July–September.

Habitat: This species is common in rocky surfaces near the banks of streams in subtropical evergreen forests in association with small herbaceous members of *Urticaceae*, *Poaceae* and a few members of *Asteraceae*.

Distribution: India, China and Myanmar.

Specimens examined: **INDIA**. Arunachal Pradesh, Anjaw District, Chaglagam, 9 Sep. 2012, R. Gogoi & S. Borah 21835 (ASSAM, ARUN).

Note: *Impatiens xanthina* collected from India has some variation from Chinese samples, such as shorter petiole, shorter peduncle, lateral sepals obliquely ovate against triangular ovate.

This species can be easily distinguished due to its moist-lithophytic nature with obliquely narrow elliptic leaves and golden yellow flowers.

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R. Gogoi, S. Borah, P. Satyanarayana : *Impatiens fugongensis*, *I. yui*, *I. xanthina* (ツリフネソウ科) の3種をインドのフロラに追加

ツリフネソウ科の *Impatiens fugongensis* K. M. Liu & Y. Y. Cong, *I. yui* S. H. Huang, *I. xanthina* H. F. Comber の3種をインド、アルナチャル・プラデシュ州から新しく報告した。本稿では、この3種について、インド産の個体にもとづいて記載するとともに図示し

た。なお、*I. fugongensis* と *I. yui* はこれまで中国固有と考えられてきたものである。

(インド・Botanical Survey of India, Arunachal Pradesh Regional Centre)